DRILL BIT, IN PARTICULAR MASONRY DRILL BIT

The invention relates to a drill bit, in particular masonry drill bit, having an elongated shaft and a cutting plate with cutting edges inclined in a rooflike manner at one end, each cutting edge being formed by the abutment of a rake face, which is situated in front of the cutting edge in the direction of rotation of the drill bit, and a flank, which is situated behind the cutting edge in the direction of rotation of the drill bit, each rake face and flank enclosing a wedge angle γ with one another, and the cutting plate having, in the central region of the drill bit, a centering tip which is offset with respect to the marginal regions and in which the cutting edges are set back in the direction of rotation in relation to the cutting edges of the marginal regions.

US 2 879 036 and EP 0 761 927 describe, for example, drill bits of this type with cutting plates, in which the centering tip is offset in a stepped manner from the marginal regions. In the case of the embodiment of the cutting plate according to US 2 879 036, the cutting edges of the centering tip and the cutting edges of the marginal regions are situated at the same height with regard to the direction of rotation and each have a rake angle of 90°. In the case of the cutting plate according to EP 0 761 927, the cutting edges of the centering tip are set back with respect to the cutting edges of the marginal regions with regard to the direction of rotation. The rake faces of the cutting edges of the centering tip have a rake angle α which ranges from 50° to 60° while their flanks have a clearance β ranging from 30° to 40°. This produces a wedge angle γ of between 80° and 100°. Although a centering tip of this type is sturdy and is suitable for chiseling, it has only poor cutting properties, which overall reduces the drilling progress per unit of time.

It is the object of the present invention to provide a drill bit, in particular masonry drill bit, having a centering tip which, in addition to good chiseling properties, also has good cutting properties.

According to the invention, this is achieved in that the cutting edges of the centering tip have, at least in the region directly adjacent to the cutting edges, a rake angle α ranging from 70° to 90° and a wedge angle γ ranging from 50° to 70°.

By means of the slender wedge angle γ in conjunction with the special rake angle α, a good cutting action of the centering tip is achieved without, which is surprising, a deterioration in the chiseling action of the centering tip occurring and without the wear of the centering tip, which is subjected to extreme stress in particular in the central region, reaching an extent which would undesirably reduce the service life of the drill bit.

A particularly good centering and spot-drilling effect is achieved if the cutting edges are set back approximately by a third of the thickness of the cutting plate and run parallel to the cutting edges of the marginal regions.

Furthermore, it is advantageous if the width of the centering tip b ranges from 25% - 50% of the drill bit diameter d.

The good spot-drilling effect of the drill bit according to the invention can also additionally be improved in that the envelope of the cutting edges of the centering tip is offset with respect to the envelope of the cutting edges of the marginal sections in the drill bit center by a certain

distance a in the direction of the drill bit axis. In this case, a distance a of the order of magnitude of 10% to 15% of the drill bit diameter has proven successful.

A further positive effect with regard to good spot-drilling action is obtained by the point angle δ_1 of the cutting edges of the centering tip being smaller than the point angle δ_2 of the cutting edges of the marginal sections. The point angle δ_1 is advantageously approximately 130°, while the point angle δ_2 is approximately 150°.

It is also advantageous if the rake faces of the cutting edges of the centering tip have a flat region, which is directly adjacent to the cutting edges and merges into curved faces which peter out centrally and downward, the flat region having a rake angle α of approximately 90°. Particularly good transportation away of the material worked off is achieved in this manner.

The invention is explained in greater detail below with reference to figures, in which:

Fig. 1 shows a perspective view of the drill bit head of a drill bit according to the invention

Fig. 2 shows the drill bit head according to Fig. 1 in a front view perpendicularly with respect to the main cutting edges

Fig. 3 shows the drill bit head according to Fig. 1 in plan view

Fig. 4 shows the cutting plate of the drill bit head according to Fig. 3 in the section A-A

Fig. 5 shows the cutting plate of the drill bit head according to Fig. 3 in the section B-B.

According to figures 1 to 3, the drill bit -1- according to the invention has an elongated shaft -15- (only partially illustrated) with grooves -16-, which are twisted helically, for conducting away the drilled-out material. The direction of rotation of the drill bit about the axis of rotation D is indicated by the arrow -17-. In order to form the drill bit head, the end of the shaft -15- is provided with a slot transversely with respect to the axis of rotation D of the drill bit -1- into which, with a somewhat excess length on the periphery, a cutting plate -2- of hard metal is soldered. The cutting plate -2- has a centering tip with two cutting edges -4-4'- adjacent to one another in a rooflike manner, and marginal sections which are adjacent to the centering tip and have cutting edges -3-3' inclined in a rooflike manner. The cutting edges -4-4' of the centering tip enclose a point angle δ_1 of 130° with one another, while the cutting edges -3-3'- of the marginal sections enclose a point angle δ_2 of 150° with one another. The cutting edges -3-3'- of the marginal regions are formed by the abutment of the rake faces -5-5'- and of the flanks -7-7' with a wedge angle γ of 50° being enclosed. The rake angle α is 90°. The cutting edges -4-4' of the centering tip are offset with respect to the cutting edges -3-3'-, with regard to the direction of rotation of the drill bit, by a third of the cutting plate thickness s and are formed by the abutment of the rake faces -6-6'- and the flanks -8-8'. The rake faces -6-6'- each have a flat region -11-11'- which is directly adjacent to the cutting edges -4-4'- and has a rake angle α of 90°. The flat region -11-11'- merges into a centrally petering-out, curved face -12-12' and into a downwardly petering-out, curved face -13-13'-. The envelope curve -9- of the cutting edges -4-4'- of the centering tip is offset with respect to the envelope curve -10- of the cutting edges -3-3' of the marginal sections in the drill bit center

by a distance a of the order of magnitude of 14% of the drill bit diameter d.

The figures illustrate particularly advantageous refinements of the invention. However, the invention is in no way restricted to them.